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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,954	04/12/2004	Evelyn Boettcher	082134-0308872	2383

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EXAMINER	
CALEY, MICHAEL H	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 12/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/821,954	BOETTCHER ET AL.
	Examiner	Art Unit
	Michael H. Caley	2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-17,24 and 26-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-17,24 and 26-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/17/05 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 13-17, 24, 26, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fernald et al. (U.S. Patent No. 6,229,827 "Fernald") in view of Hay et al. (U.S. Patent No. 6,278,811 "Hay").

Regarding claim 13, Fernald discloses a method of filtering an optical signal comprising the steps of:

coupling an optical signal having a plurality of wavelengths (Column 4 lines 17-22) into an optical fiber (Figure 15 element 10); and

selectively filtering at least one wavelength out of the plurality of wavelengths by varying a load applied to a compliant support block (Figure 15 element 20) having at least a first portion of the optical fiber embedded therein (Column 4 lines 23-54), the varying the load causing the compliant support block to apply an axial strain upon the first portion of the optical fiber,

wherein the first portion of the optical fiber has a periodic variation in refractive index along at least a portion thereof to form a fiber Bragg grating in the fiber (Column 3 lines 54-63).

Fernald fails to explicitly disclose the step of varying the load as causing the compliant support block to apply a radial strain upon the first portion of the optical fiber in addition to the axial strain. Hay, however, teaches a fluid pressure chamber (Hay: Figure 1) analogous to the chamber taught by Fernald (Fernald: Column 6 lines 46-65), which exerts pressure to the support block in directions parallel to each of the axial direction and the radial direction of the fiber (Figure 1 element P). The support block in turn causes an axial strain and pressure in the radial direction on the fiber due to deformation of the support.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to cause the compliant support block to apply both an axial strain and a radial strain upon the first portion of the optical fiber. One would have been motivated to apply an axial and radial strain to the first portion of the optical fiber as a means of tuning the reflection wavelength of the grating according to the teachings of Fernald (Column 6 lines 46-65) and Hay (Column 4 line 55 – Column 5 line 13).

Regarding claim 14, Fernald discloses varying the load applied to the compliant support block as changing a transmission characteristic of the fiber Bragg grating (Column 4 lines 23-54).

Regarding claim 15, Fernald discloses the compliant support block as having a substantially cylindrical shape (Column 4 lines 23-25), and wherein the varying the load applied to the compliant support block comprises changing a compressional force applied between opposing ends of the compliant support block (Figure 15; Column 6 lines 46-65).

Regarding claim 16, Fernald discloses the filtered optical signal as reflected from the fiber Bragg grating (Column 4 lines 17-22).

Regarding claim 17, Fernald discloses the filtered optical signal as transmitted through the fiber Bragg grating (Column 4 lines 17-22).

Regarding claim 24, Fernald fails to explicitly disclose the step of varying a load as causing deformation of the compliant support block, such that a radial component of the compliant support block increases and decreases with respective increases and decreases of the load. Fernald, however, discloses an apparatus in which the compliant support block inherently experiences deformation as proposed. Hay, for example, discloses a compliant support block of the same material as used by Fernald as experiencing such deformation (Column 4 line 55 –

Column 5 line 14, Column 6 lines 44-46). The pressure exerted at longitudinal ends of the support block as disclosed by Fernald (Figure 1) thus implies a radial component of the compliant support block as increasing and decreasing responsive to increases and decreases of the load due to its deformable nature.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary a load to cause deformation of the compliant support block, such that a radial component of the compliant support block increases and decreases with respective increases and decreases of the load. One would have been motivated to cause such deformation to the support block as a means of tuning the reflection wavelength of the grating according to the teachings of Fernald (Column 6 lines 46-65) and Hay (Column 4 line 55 – Column 5 line 13).

Regarding claim 26, Fernald fails to disclose an embodiment for which an amount of the axial strain is dependent upon an acute angle formed between the axis of the radial component of the fiber and the axial direction of the optical fiber. Hay, however, teaches alternative embodiments (Figures 8 and 9, for example) for which an amount of axial strain is dependent upon an acute angle formed between the axis of the radial component of the fiber and the axial direction of the fiber.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the compliant support block to have one of the alternative forms as taught by Hay, such that an amount of axial strain is dependent upon an acute angle formed between the axis of the radial component of the fiber and the axial direction of the fiber. One would have

been motivated to form the compliant support block to have one of such alternative forms to adjust the pressure sensitivity of the tunable filter (Column 6 lines 44-46, 58-59).

Regarding claim 30, Fernald discloses the apparatus for achieving the method of filtering the optical signal (Figure 15).

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fernald in of Hay and in further view of Pan et al. (U.S. Patent No. 6,240,220 "Pan").

Fernald discloses all of the proposed limitations except for a relationship between a length of the at least one selectively reflected wavelength and the length of the rigid surface displacement as substantially linear. Pan, however, teaches the variation of the filtered wavelength as proportional (or linearly related) to the change in the length of fiber (Column 4 lines 16-41; Column 5 lines 40-56).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the grating such that the length of the filtered wavelength is linearly related to the displacement of the rigid surface. Pan teaches such a relationship in a tunable grating as advantageous so that the controller may be constructed with a lesser complexity (Column 1 lines 37-65).

Claims 28, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fernald in view of Hay and in further view of Milhailov et al. (U.S. Patent No. 5,706,375 "Milhailov").

Regarding claim 28, Fernald discloses all of the proposed limitations except for the steps of passing wavelengths through the first fiber Bragg grating to a second portion of the optical fiber embedded in a second compliant support block, the second portion having a periodic variation in refractive index along at least a portion thereof to form a second fiber grating in the optical fiber, selectively reflecting at least a second wavelength by varying a load applied to the compliant support block, and forming a second optical signal of the first and second wavelengths. Milhailov, however, teaches an arrangement of multiple tunable fiber Bragg gratings in series operable to reflect different wavelengths of a signal along a common fiber to form a composite signal of multiple reflected wavelengths (Column 6 lines 23-51; Figure 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have filtered an optical signal according to the proposed method of having two tunable fiber Bragg gratings in series as proposed and form a second optical signal of the first and second optical wavelengths using the individual compression-tuned Bragg gratings disclosed by Fernald. One would have been motivated to filter an optical signal using such a method as a means of a routing or demultiplexing function capable of attenuating a signal (Milhailov, abstract, column 2 lines 11-24).

Regarding claim 29, Fernald fails to disclose the second optical signal as formed at a third portion of the optical fiber located before the first and second fiber Bragg gratings in a transmitting direction of the other wavelengths passed through the first fiber Bragg grating. Milhailov, however, teaches such a portion of fiber between the circulator and the first Bragg grating as a part of an optical routing system (Figure 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a third portion of optical fiber before first and second compression-tuned Bragg gratings such as disclosed by Fernald. One would have been motivated to filter an optical signal using such a method as a means of a routing or demultiplexing function capable of attenuating a signal (Milhailov, abstract, column 2 lines 11-24).

Regarding claim 31, Fernald as modified by Milhailov discloses all of the proposed limitations except for a circulator configured to form a second optical signal of the first and second wavelengths arranged at a third portion of the optical fiber located before the first and second fiber Bragg gratings. Milhailov, however, teaches such a circulator as a part of an optical routing system (Figure 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a circulator before first and second compression-tuned Bragg gratings such as disclosed by Fernald. One would have been motivated to filter an optical signal using such a method as a means of a routing or demultiplexing function capable of attenuating a signal (Milhailov, abstract, column 2 lines 11-24).

Response to Arguments

Applicant's arguments with respect to claims 13-17, 24, and 26-31 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (571) 272-2286. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael H. Caley
December 20, 2005
mhc

ANDREW SCHECHTER
PRIMARY EXAMINER